

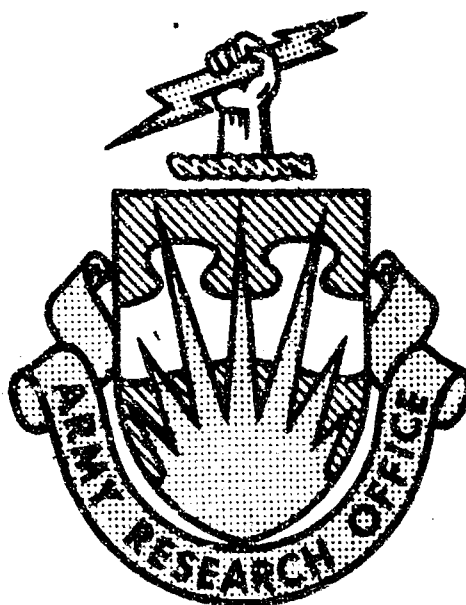
AD 660330

AD

Report Number 2

The Cerebral Localization of Language Functions

FINAL REPORT



Approved for release and sale; its use is unlimited.

By: Augusto Gentil Baptista

April 1967

DA-ARO-49-092-66-G124

Army Project Number: 2N014501B71D 00 019 LA

Hospital Professor Hedgar Santos, Universidade Federal da Bahia
Salvador, Bahia, Brazil

U. S. Army Element

Defense Research Office, Latin America

Rio de Janeiro, Brazil

DDC

OCT 31 1967

CLEARINGHOUSE

14

THE CEREBRAL LOCALIZATION OF LANGUAGE FUNCTIONS

FINAL REPORT

by

Augusto Gentil Baptista

APRIL 1967

U. S. Army Element
Defense Research Office for Latin America
Rio de Janeiro, Brazil

U. S. Department of the Army Project Number 2N01450131D

Núcleo de Medicina Experimental
Hospital Prof. Edgard Santos
Universidade Federal da Bahia
Salvador, Bahia, Brazil

A reformulation of last year's report Tables I & II confirms previous findings. The total number of patients was increased to 102.

TABLE I

	<u>S/encephalic lesion</u>		<u>G/encephalic lesion</u>		
	Evidence:		Evidence:		
<u>Cultural level:</u>	Clinical	Pathologic	Clinical	Pathologic	Total
Completely Illiterate	28	5	9	1	43
Barely alphabet.	17 (63%)	7	2 (69%)	0	26 (68%)
Schooling, up to					
1st.grade	2	0	1	0	3
2nd.grade	3	0	0	0	9
3rd.grade	4	0	0	1	5
4th.grade	3	0	0	0	3
5th.grade	7	1	2	0	10
Above	1 (37%)	0	2 (31%)	0	3 (32%)
Total	71	13	16	2	102

TABLE II

<u>Cultural Level</u>	Cases s/encephalic lesion, by:			
	Clinical evidence		Pathologic evidence	
	<u>Language:</u>		<u>Language:</u>	
	normal	abnormal	normal	abnormal
Completely illiterate	2	26	1	4
Barely alphabetized	8 (34%)	9 (83%)	2	5
Schooling, up to				
1st. grade	2	0	0	0
2nd. grade	6	3	0	0
3rd. grade	3	1	0	0
4th. grade	3	0	0	0
5th. grade	5	2	1	0
Above	0 (66%)	1 (17%)	0	0
	<u>29</u>	<u>42</u>	<u>4</u>	<u>9</u>

Of these, only 18 (18%) had clinical or pathologic evidence of encephalic lesion, while as much as 66 patients produced abnormal language test results. 51 (61%) out of the 84 patients without brain lesion committed mistakes which would be of pathological meaning if measured by current standards. Sixty-eight per cent of the patients were grossly illiterate. Forty-four (79%) out of 56 illiterate patients showed abnormalities in the language test results, while only 7 (26%) out of 27 patients with some scholarship showed such abnormalities.

Illiteracy, then, leads to poor language, and probably is related to the low I.Q. evident in these patients. These findings lead one to suspect that oligophrenia may be widely distributed among low cultural and socio-economic level populations.

As regards the number of mistakes committed in each individual test, the same trend noted in the previous report was maintained.

In 2 patients showing abnormal language, brain lesions were demonstrated on post-mortem examination. One of these had been examined before and after development of clinical manifestations of the lesion.

The findings are described below.

CASE REPORT

A 46-year-old, illiterate, right-handed, negro male, suffering from Chagas' disease and atrial fibrillation, had his language examined on June 1965. No neurological abnormalities were found on both history and physical examination. On October 5, he was admitted to the ward, due to right hemiplegia of sudden onset 12 days previously. Language was reexamined on October 6 to 9. On October 20, 1965, the patient died suddenly. Massive pulmonary embolism was demonstrated as the cause of death, at autopsy.

Language test results obtained were as follows.

<u>Before hemiplegia</u>	<u>After hemiplegia</u>
SECTION A	
1 & 2: No significant mistakes	No change
SECTION B	
1 & 2: Not done, due to illiteracy	No change
3: a & b: No mistakes	No change
SECTION C	
1. Suppression of 6 words on period no. 7	No change
2: 1) Wrong - "I don't know" (correct answer would be "no, he didn't")	Wrong - "he was a great poet"
2) Right - "yes, he did"	Wrong - "I mean to say: to verify"
3) Right - "no, they didn't"	Wrong - "was he the one who discovered Brazil?"
4) Right - "yes, they came"	Right - "yes, they came"
5) Right - "no, they didn't"	Wrong - "it was an argument among the great poets",
6) Wrong - "yes, he did"	Wrong - "under disguise"
3: Right	Right
4: Right	Right
5: Right	Totally wrong

BeforeAfter

SECTION D

1. a, b & c: No mistakes
 2. a: No mistakes
 b: No mistakes
 3. a: No mistakes
 b: No mistakes
 c: No mistakes

No change
 No change
 Pictures 5 & 6 - repeated "necktie"
 Pictures 9 & 10 - repeated "pider"
 Only one correct answer: no.3
 Entirely unable to accomplish
 the test: insisted on
 indiscriminately pointing to the
 whole group of crayons
 To question no.1 answered -
 "cloud"
 On question no.4 repeated -"red"

SECTION E

1. a: Distortion of letters b & a
 b: Direct series - erred on
 nos.9 & 10
 Reverse series - erred from
 no.4
 2. a to f: Not done, due to ill-
 literacy
 3. a: Correct answers to 1, 4,
 6 & 9
 b & c: Not done, due to ill-
 literacy
 d: Correct answers to 1, 2 & 3
 4. a & b: Slight distortion
 (see Fig.1)

Entirely unable to accomplish
 the test
 Direct series - no change
 Reverse series - erred from no.2
 No change
 Only one correct answer: no.4
 No change
 Totally wrong
 Extreme distortion (see Fig.1)

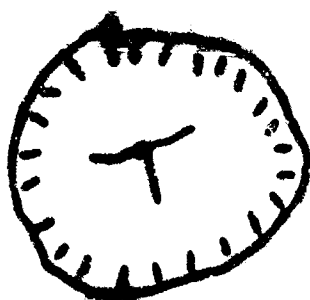
SECTION F

1. a & b: Not done, due to ill-
 literacy
 2. a: 1)Right
 2)Right
 3)Wrong - "I don't know"
 4)Right
 5)Wrong - "courage to do"

No change
 Wrong - "common"
 Wrong - repeated "robin"
 Wrong - "it is a hero"
 Wrong - "bird"
 Wrong - "resisting"

EXERCISE 1

Before



After



Final

Before

- 6)Wrong - "to repair old things; to become new again"
- b: 1)Wrong - "I don't know"
- 2)Wrong - "I don't know; I have heard this before, but I don't understand")
- 3)Right

After

- Wrong - "may be it is useful"
- Wrong - "nothing"
- Wrong - "it is a pitfall"
- Wrong - "he who walks exists, works"

SECTION G

- | | | |
|-----------|-------|---------------------------------------|
| 1: | Right | Totally wrong |
| 2: | Right | Right, 1 & 2
Wrong, 3 to 5 |
| 3. a & b: | Right | Unable to accomplish any of the tests |

SECTION H

- | | | |
|-------|---------------------------------|---------------------------------------|
| 1. a: | Right, 1 to 6
Wrong, 7 | Totally wrong |
| b: | Right, 3 to 6
Wrong, 1 & 2 | Only one correct answer: no.6 |
| c: | Right | Totally wrong |
| 2. a: | Moderate distortion (see Fig.2) | Extreme distortion (see Fig.2) |
| b: | Slight distortion (see Fig.2) | Marked distortion, 1 to 3 (see Fig.2) |
| | | Unable to reproduce 4 to 7 |

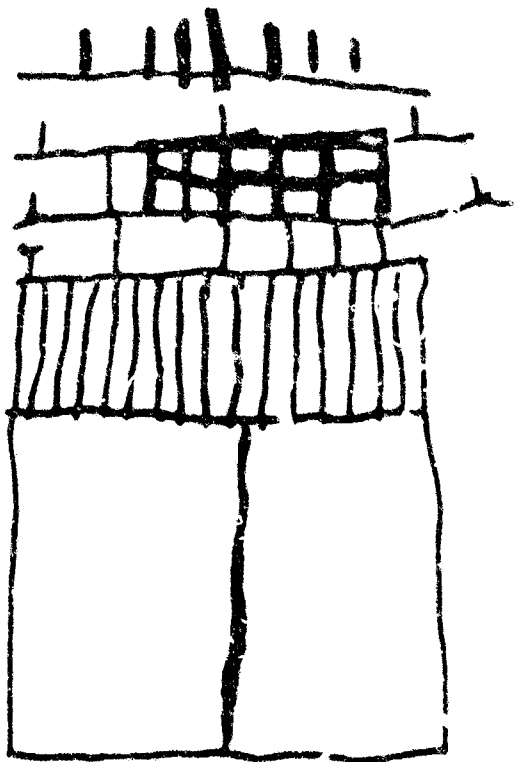
SECTION I

- | | | |
|-------|-------|--------------------------------|
| 1. a: | Right | Totally wrong |
| b: | Right | Right, 1 to 3
Wrong, 4 to 8 |
| 2. | Right | Only one correct answer: no.1 |

SECTION J

Although illiterate, the patient was able to cut 36 out of 56 letters a (missed 20)

Entirely unable to accomplish the test



Before

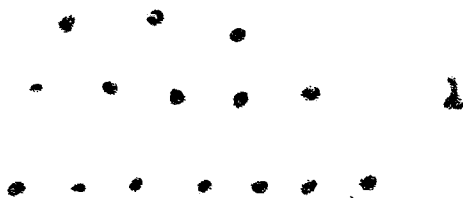
SECTION E-2-a



After

SECTION E-2-b

Before



After



2



1



Fig. 2

In summary, the following was observed after the development of a large cerebral lesion.

Perseveration

Lowered comprehension of spoken language

Possible chromatoagnosia

Apraxia, including constructional apraxia

Acalculia

Loss of space perception

Somatoagnosia

Inattention

Perservation of memory, as well as of the capacity of
sounds identification and expression

Extensive brain softening was found at autopsy, grossly corresponding to the area of distribution of the left middle cerebral artery, as demonstrated by the enclosed diagrams (Fig. 3 to 5).

Although obviously not conclusive in relation to the localization of language functions on the forebrain, the case above presented corroborates some of the existing knowledge and shows a research line to be followed for the clarification of the seat of such functions.



Fig.3



Fig.4



Fig.5

Unclassified

Security Classification

Not located

DOCUMENT CONTROL DATA - R&D		
(Security classification of title, body of abstract and indexing annotation must be entered when the overall report is classified)		
1. ORIGINATING ACTIVITY (Corporate author) Hospital Prof. Edgard Santos, Faculdade de Medicina Universidade Federal da Bahia, Salvador, Bahia, Brazil		2a. REPORT SECURITY CLASSIFICATION Unclassified
		2b. GROUP 9. NA 21. pagado
3. REPORT TITLE THE CEREBRAL LOCALIZATION OF LANGUAGE FUNCTIONS		
4. DESCRIPTIVE NOTES (Type of report and inclusive dates) Final Report		
5. AUTHOR(S) (Last name, first name, initial) Baptista, Augusto Gentil		
6. REPORT DATE April 1967	7a. TOTAL NO. OF PAGES 8	7b. NO. OF REFS
8a. CONTRACT OR GRANT NO. DA-ARO-49-092-66-G124	9a. ORIGINATOR'S REPORT NUMBER(S)	
b. PROJECT NO. 21014501B71D 00 019 LA	9b. OTHER REPORT NO(S) (Any other numbers that may be assigned this report)	
c.		
d.		
10. AVAILABILITY/LIMITATION NOTICES Unlimited		
11. SUPPLEMENTARY NOTES None	12. SPONSORING MILITARY ACTIVITY U.S. Army Element Defense Research Office, Latin America U. S. Embassy, APO New York 09676	
13. ABSTRACT Continuation of a long term study to correlate focal brain lesions resulting from Chagas disease with changes in speech functions. Patient group expanded to 102. Two died during period and were autopsied. Lesion in one gross with extensive softening in area of left cerebral artery. Insufficient data at this stage to discuss correlations.		

DD FORM 1473
1 JAN 64

Unclassified

Security Classification

KEY WORDS	LINK A		LINK B		LINK C	
	ROLE	WT	ROLE	WT	ROLE	WT
Chagas disease Physiology Neurology Functional centers Brain lesion						

INSTRUCTIONS

1. **ORIGINATING ACTIVITY:** Enter the name and address of the contractor, subcontractor, grantee, Department of Defense activity or other organization (corporate author) issuing the report.

2a. **REPORT SECURITY CLASSIFICATION:** Enter the overall security classification of the report. Indicate whether "Restricted Data" is included. Marking is to be in accordance with appropriate security regulations.

2b. **GROUP:** Automatic downgrading is specified in DoD Directive 5200.10 and Armed Forces Industrial Manual. Enter the group number. Also, when applicable, show that optional markings have been used for Group 3 and Group 4 as authorized.

3. **REPORT TITLE:** Enter the complete report title in all capital letters. Titles in all cases should be unclassified. If a meaningful title cannot be selected without classification, show the classification in all capitals in parentheses immediately following the title.

4. **DESCRIPTIVE NOTES:** If appropriate, enter the type of report, e.g., interim, progress, summary, annual, or final. Give the inclusive dates when a specific reporting period is covered.

5. **AUTHOR(S):** Enter the name(s) of author(s) as shown on or in the report. Enter last name, first name, middle initial. If military, show rank and branch of service. The name of the principal author is an absolute minimum requirement.

6. **REPORT DATE:** Enter the date of the report as day, month, year. If more than one date appears on the report, use date of publication.

7a. **TOTAL NUMBER OF PAGES:** The total page count should follow normal pagination procedures, i.e., enter the number of pages containing information.

7b. **NUMBER OF REFERENCES:** Enter the total number of references cited in the report.

8a. **CONTRACT OR GRANT NUMBER:** If appropriate, enter the applicable number of the contract or grant under which the report was written.

8b, 8c, & 8d. **PROJECT NUMBER:** Enter the appropriate military department identification, such as project number, subproject number, system numbers, task number, etc.

9a. **ORIGINATOR'S REPORT NUMBER(S):** Enter the official report number by which the document will be identified and controlled by the originating activity. This number must be unique to this report.

9b. **OTHER REPORT NUMBER(S):** If the report has been assigned any other report numbers (either by the originator or by the sponsor), also enter this number(s).

10. **AVAILABILITY/LIMITATION NOTICES:** Enter any limitations on further dissemination of the report, other than those imposed by security classification, using standard statements such as:

- (1) "Qualified requesters may obtain copies of this report from DDC."
- (2) "Foreign announcement and dissemination of this report by DDC is not authorized."
- (3) "U. S. Government agencies may obtain copies of this report directly from DDC. Other qualified DDC users shall request through _____."
- (4) "U. S. military agencies may obtain copies of this report directly from DDC. Other qualified users shall request through _____."
- (5) "All distribution of this report is controlled. Qualified DDC users shall request through _____."

If the report has been furnished to the Office of Technical Services, Department of Commerce, for sale to the public, indicate this fact and enter the price, if known.

11. **SUPPLEMENTARY NOTES:** Use for additional explanatory notes.

12. **SPONSORING MILITARY ACTIVITY:** Enter the name of the departmental project office or laboratory sponsoring (paying for) the research and development. Include address.

13. **ABSTRACT:** Enter an abstract giving a brief and factual summary of the document indicative of the report, even though it may also appear elsewhere in the body of the technical report. If additional space is required, a continuation sheet shall be attached.

It is highly desirable that the abstract of classified reports be unclassified. Each paragraph of the abstract shall end with an indication of the military security classification of the information in the paragraph, represented as (TS), (S), (C), or (U).

There is no limitation on the length of the abstract. However, the suggested length is from 150 to 225 words.

14. **KEY WORDS:** Key words are technically meaningful terms or short phrases that characterize a report and may be used as index entries for cataloging the report. Key words must be selected so that no security classification is required. Identifiers, such as equipment model designation, trade name, military project code name, geographic location, may be used as key words but will be followed by an indication of technical context. The assignment of links, rules, and weights is optional.